2001 ANNUAL REPORT

PARKER MOUNTAIN ADAPTIVE RESOURCE MANAGEMENT PLAN

Submitted to

Parker Mountain Grazing Association
Wayne and Piute County Commissions
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Utah School and Institutional Trustlands Administration
Utah Division of Wildlife Resources
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EXECUTIVE SUMMARY

The Parker Mountain Adaptive Resource Management Plan (PARM) Working Group became operational in 1998. The purpose of PARM is to restore Sage Grouse populations and enhance the economic vitality of local communities in Wayne and Puite Counties. To achieve these goals, PARM began monitoring Sage Grouse populations and habitat use patterns on Parker Mountain. This information has been used to identify and guide rangeland habitat management experiments designed to increase rangeland vegetation diversity.

Currently, the Sage Grouse population on Parker Mountain appears to be increasing. This year we recorded the highest lek counts ever recorded on Parker Mountain. The counts were ~20% higher than last year's count. We also monitored the seasonal movements and status of 25 hens that were fitted with radio-collars. Nearly 70% (n = 18) of the hens nested. Nest initiation dates were similar to previous years. Nest predation was not significant this year, but nest abandonment was higher than any other recorded year. The average clutch size was the similar to last year (6-7 eggs per nest). Nest success was lower this year (50%) than last year (84%). Hens moved, on average, 20.1 km from the lek to brood-rearing habitat. The furthest distance traveled was 28.5 km.

In October 2000, four 100 acres plots were treated with the tebuthiuron. The response of the sagebrush to the tebuthiuron treatments was visually obvious. Although, after measurements were made, there was no significant difference in vegetation cover detected between the treated and non-treated sites. We suspect the exceptionally wet year and the delayed effects of the tebuthiuron made it difficult to record a measurable response. There was a significant difference between the percent forb cover in grazed and ungrazed areas. There was more herbaceous cover inside the exclosures than outside. A month later, the exclosures exhibited the reverse vegetation trend. The vegetation inside the exclosures was more utilized than outside. Our observations suggest lagomorphs may be taking up to 20% of the forage. We will assess the lagomorph herbivory next season.

In October 2001, four 100 acre plots were treated using the Dixie harrow. Another four 100 acre plots were treated with the Lawson aerator. These plots will be

rested from grazing for two growing seasons. We will continue to monitor vegetation response and Sage Grouse use in response to these treatments over the next 2 years.

Sage Grouse Hen Captures

In January 2001, six of the radio-collars that were fitted on Sage Grouse hens on Parker Mountain were still transmitting signals. These hens were relocated on traditional wintering areas during a telemetry flight conducted by study personnel and Utah Division of Wildlife Resources (UDWR) pilots. The hens were wintering near the Black Point and Bull Roost leks (Figure 1). We annually record a large numbers of birds wintering in these areas.

In March 2001, we attempted to capture an additional 24 hens and fit them with radio collars. We attempted to capture these birds near the Bull Roost lek. This was the same lek we captured birds from in March 2000. This lek was selected because of the large number of hens that roost near this lek and the potential for many of the hens to select nests sites on the Parker Lake Pasture (Figure 1). PARM selected this pasture as the first experimental sagebrush management area.

Because of the difficulty we experienced in March 2000 with spot-light trapping techniques, we experimented with modified walk-in traps that are designed to be placed directly on the lek. The walk-in traps have worked well in Canada and in Washington. We supplemented this effort with spot-light trapping.

We visited the Bull Roost lek the second week in March 2001. Because of the heavy snow cover, we used snowmobiles to access the lek. Although the lek was covered with up to two feet of snow in some places, we observed a large number of Sage Grouse tracks near and on the lek. Thus, it was clear active strutting had already begun despite the snow cover. We set the traps and left them in place until April 10. The traps were checked daily throughout this period. We did not capture any hens in the walk-in traps.

In early April, when hen attendance was increasing on the leks, we began spot-lighting the roosting sites around the Bull Roost lek. From April 8 to April 10, we captured and placed radio collars on 19 hens. With these new captures and the six previously radio-collared hens from 2000, we had 25 birds to monitor during 2001. We attempted to recapture the six birds captured in 2000 at the end of the 2001 field season and refit them with new collars. Our attempts to recapture the 2000 hens were

unsuccessful. We approached the hens on foot with spot-lights and loud music. The hens typically flushed before we could get within range of the hand nets.

Sage Grouse Lek Counts

On April 1, we began counting strutting males on the Bull Roost lek. Peak male and female attendance was observed on April 9, when we counted 193 males and 303 females. Overall, the number of males counted on leks increased from 425 in 2000 to 543 this year. This is a 22% increase and is the highest recorded since the 1970's when 497 males were counted (Figure 2).

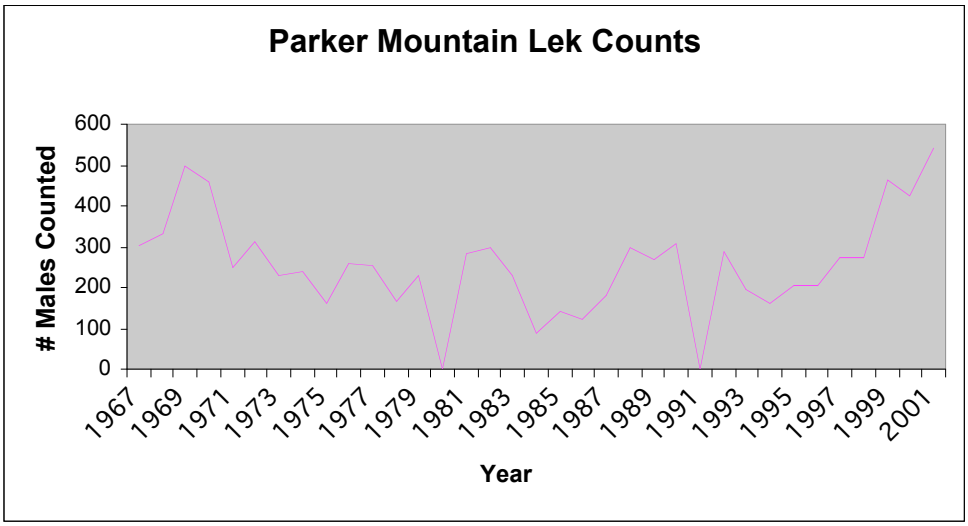

Figure 2. Historical lek counts trends of the Parker Mountain Sage Grouse Population

Monitoring Parker Mountain Sage Grouse Hens

In mid-May, we began monitoring the movements and activities of the 25 radio-collared hens to determine their seasonal habitat use patterns. We were interested in identifying and describing the habitats they used for nesting and brood-rearing. We also want to determine their nesting success as well as chick and adult hen survival rates.

Nesting Activity

The radio-collared hens began nesting (incubation) between April 28 and May 11. Between late April and mid-May, 18 of the 25 collared hens (72%) had established nests. During the incubation period (~28 days), six nests (33%) were depredated and three nests (17%) were abandoned. Of the depredated nests, three (16.5%) were destroyed by avian predator (ravens), one (5.5%) was confirmed coyote, and fate of the other two (11%) could not be determined. The nine (50%) remaining birds with established nests hatched chicks. The average clutch size (not including the abandoned nests) was 6-7 eggs per nest.

Brood-rearing activity

To determine chick survival rates, we compared the number of chicks that hatch per nest, to the number of chicks observed to be alive 40 days later. On average, each hen left the nest with 6.5 chicks. Forty days later, we recorded an average of 1.9 chicks per hen.

Recent information from studies conducted in southeastern Idaho (Burkpile unpublished), suggests chick survival cannot be accurately assessed after 21 days of age. After 3 weeks of age, chicks have been documented to "brood hop". If broods are hopping from hen to hen after three weeks of age, our techniques may be underestimating chick survival.

Over the course of the summer, the hens with and without broods generally moved in a southerly or southeasterly direction on Parker Mountain. The birds were moving to higher elevations to possibly take advantage of better foraging conditions. Similar movements were documented during the previous 3 years. Two of the 25 hens

used the experimental Parker Lake pasture. The hens traveled long distances from breeding grounds to late summer foraging sites (Table 1). On average, all of the radio-collared hens we monitored traveled at least 20.1 km (this is straight line distance), from Bull Roost lek to the late summer forage sites (range 9.5 – 28.5 km). For hens with known nests, the average movement from the lek to the nest site was approximately 11.4 km (range 3.5 - 25.5 km). After successfully hatching, the average distance traveled from the nest to late brood-rearing habitat was 11.5 km (range 1.5 – 22.0 km).

	Aver. Dist. from lek to nest site	Aver. Dist. fr. Nest to late-season forage	Aver dist fr. Lek to late season forage sites
All Nesting Hens	**11.4 km**	**11.7 km**	**22.3 km**
Hen with brood	**n/a**	**11.5 km**	**23.8 km**
Hens w/out broods	**n/a**	**11.9 km**	**20.8 km**
All hens	**n/a**	**n/a**	**20.1 km**

Table 1: The summary of distances traveled from lek to nest site, nest site to forage sites, lek to forage sites for hens with broods, hens that lost nests, all hens (nested or not), and all nesting hens.

Status of Adult Hens

As of October 11, 6 out of the original 25 radio-marked hens were dead. This represents a survival rate of 76% from March to October. Two of the hens appeared to have been killed by avian predators (eagle or hawk). Two more hens were confirmed killed by red-tailed hawks. One hen was killed by a coyote while incubating her nest. The coyote den and her partial remains were discovered nearby. The last mortality appeared to be the result of a mammalian predator. However, we were not able to determine the specific predator.

Parker Lake Experimental Pasture

Based on work conducted previously by Joel Flory, the Parker Lake Pasture was selected by the Parker Mountain Adaptive Resource Management (PARM) working group in early 2000 as the experimental pasture to evaluate the effect of several

sagebrush management treatments on Sage Grouse and vegetation diversity. Three sagebrush management treatments were implemented on the pasture to evaluate their effect on reducing sagebrush canopy cover and increasing vegetation diversity.

In the spring 2000, 18 plots were mapped across the landscape encompassing the largest, thickest stands of big mountain sagebrush (*A. tridentata* ssp. *vaseyana*). During the fall of 2000, four randomly selected plots were aerially treated with tebuthiuron (Spike) at three-tenths pound per acre. The other mechanical treatments were delayed due to early snowfall on site. During the 2001 field season we focused our evaluation on the four tebuthiuron treatments and four control plots.

The remaining 8 plots were treated in October 2001. Four of the plots were Dixie harrowed and four were treated with the Lawson aerator. The aerator was provided by the UDWR. The sites that were harrowed were reseeded with a specially designed seed mixture provided by the UDWR.

Because the proposed mechanical treatments were not implemented until 2001, resting the pasture from grazing by domestic livestock was delayed a year. Therefore, with continued grazing of the experimental pasture after tebuthiuron was applied, we needed to determine if grazing would impact vegetation responses to the treatment.

To determine if any impacts occurred, we needed to exclude livestock from some areas within each plot. To do this, we constructed an exclosure in each plot. These exclosures enabled us to measure vegetation response within the treatments with and without livestock grazing.

The exclosures were square-shaped 16 foot by 16 foot plots. We used steel wire panels, 16 feet in length, 5 feet in height, with openings excluding wild and domestic ungulates to construct the enclosures. To measure the difference between grazed and ungrazed vegetation in each plot, a square of identical size was flagged adjacent to each exclosure. The squares were placed in the densest sagebrush stand within each of the eight plots.

The vegetation inside and outside the exclosures was sampled twice during the summer. The goal was to sample during the early and the late brood-rearing stages (mid-June and mid-July). This sampling schedule also coincided with the beginning and ending of the livestock grazing period in the Parker Lake pasture. The squares were

partitioned with a measuring tape in a nine-square grid design (Figure 3). On each line a Daubenmire frame was placed over the tape and the percentages of forbs, grasses, litter, rock and bare ground were determined.

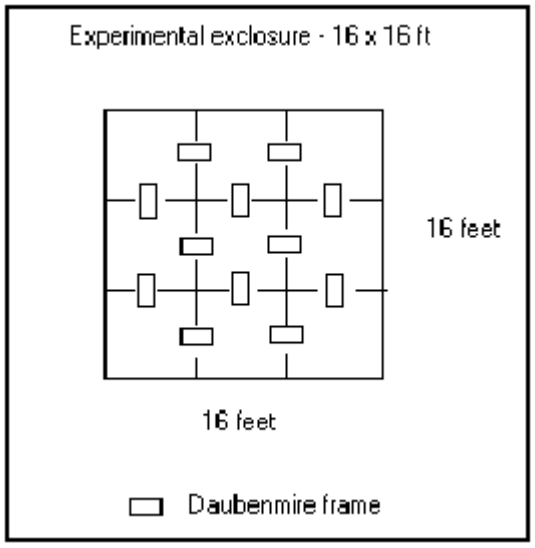

Figure 3. Exclosure sampling pattern

After grazing, the percent forb cover inside the exclosures was different than that found outside the exclosures. (Figure 4).

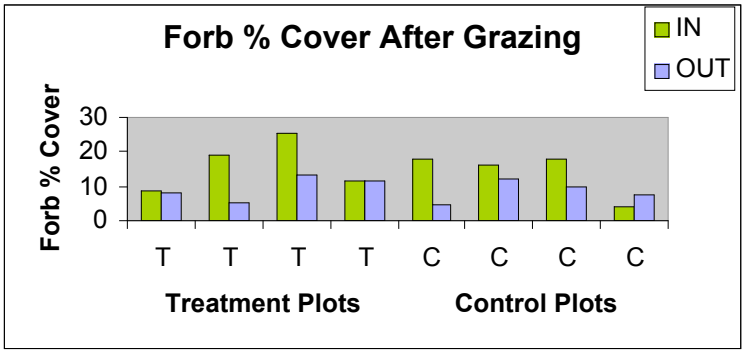

Figure 4. Comparison of percent forb cover in and outside of Parker Lake Pasture exclosure for treatment and control areas, 2001.

The first year of post-treatment data did not show a significant increase in understory herbaceous cover on the treated sites. Given the delayed effect of the chemical treatment, it may take more than one growing season to observe a measurable response to the treatment.

During a late September trip to see the exclosures, we observed that significant lagomorph herbivory had occurred inside the exclosures. This is not a factor we had considered during the exclosure construction. Next year, we plan to construct rabbit-proof exclosures near the original enclosures to assess the effects of lagomorph herbivory in the area. However, our initial observations suggest that lagomorph herbivory may account for up to 20% of forage utilization in the Parker Lake Pasture.

We also will begin to monitor lagomorph population trends. An increase in lagomorph population accompanied by increased forage utilization could have significant effects on the vegetation diversity inside the treatments. If our observations support that lagomorphs may be using up to 20% of the available forage, management strategies designed to reduce population densities may need to be implemented and evaluated.

To stay consistent with the previous year's vegetation collection techniques, we repeated the vegetation sampling using the point-intercept method. Within the big sagebrush areas, 100 points were sampled. The five random points from last year were located using GPS coordinates. A 20-meter tape was stretched out in the same assigned direction and a type of cover was recorded at each meter (i.e. grass, forb, rock, litter, bare ground). To better assess the canopy cover, we also used the tape measure for line-intercept sampling (Table 2).

Table 2. Comparison of results from point intercept and line intercept vegetation sampling techniques, 2001

Point-intercept Results				
Cover Type % Averages	Treatment Plots		Control Plots	All Plots Combined
	Dixie Harrow	Lawson Aerator		
Grass	11.50	7.00	9.00	9.17
Forbs	7.75	10.25	8.00	8.67
Litter	49.50	53.00	56.00	52.83
Bare	21.00	22.50	17.00	20.17
Rock	7.00	6.00	2.50	5.17

Line-intercept Results				
Shrub Canopy Cover	Treatment Plots		Control Plots	All Plots Combined
	Dixie Harrow	Lawson Aerator		
Big Mtn Sage.	35.08	37.63	36.15	32.29
Silver Sage	1.395	1.2	0.57	1.06
Black Sage.	0.0075	0.03	0	0.01
Snowberry	0.065	0	0	0.02
Total Cover	36.5475	38.86	36.72	33.38

Predation Management

U.S.D.A. Wildlife Services (WS) has been conducting a predation management program on Parker Mountain. Between December 1, 2000 and June 30, 2001, a total of 111 coyotes and 2 red fox were removed. Additionally, 2 coyote dens were removed from sage grouse nesting areas. A total of 14 DRC-1339 eggs were placed near the local landfill for raven control. In addition to protecting Sage Grouse, WS is protecting domestic sheep yearlong in the area. This control program also is benefiting pronghorn and Sage Grouse.

Utah Prairie Dog Mitigation Bank

In October 2000, PARM representatives met with staff from Utah State and Institutional Trustlands Administration (SITLA), UDWR, U.S. Fish and Wildlife Service

(USFWS), and Environmental Defense to discuss a mitigation bank concept for Utah prairie dogs. Two possible Utah prairie dog mitigation banks sites have been identified on Parker Mountain. These sites are both approximately 200 acres in size. They are located near Flossie Knoll and the Tanks areas. A draft mitigation plan concept paper has been prepared by Environmental Defense. A draft management plan was prepared by Terry Messmer and Joel Flory to accompany this document. The USFWS has received a grant to prepare a regional Utah prairie dog habitat conservation plan (HCP). Once this plan is prepared the mitigation bank concept can move forward.

Monitoring Vegetation Production and Utilization Using GIS Technology

SITLA and Utah State University received a grant through the NASA Affiliated Research Center Program (ARC) to evaluate the use of remote sensing and GIS technology to estimate range forage production and utilization on Parker Mountain. Todd Black was hired as the GIS technician. Walt Hanks was hired through the Wayne County Extension office as the range technician. This work was initiated in June 2001 and will be completed in January 2002. A final report of this project will be submitted to PARM partners under a separate cover.

Conclusions

The Sage grouse population on Parker Mountain appears to be increasing slightly. This year we observed the highest lek counts ever recorded on Parker Mountain. The counts were ~20% higher than last year's count. This is even despite the extreme fluctuations in precipitation over the last 3 years. This demonstrates the bird's ability to endure extreme variability in conditions given suitable habitat conditions. Greater population increases in the subsequent years are expected in response to the vegetation treatments in Parker Lake Pasture and other treatments that will be implemented in subsequent years.

The sample of marked hens had the highest recorded nesting initiation percentage (72%) ever recorded on Parker Mountain. Nest initiation dates for this year were similar to previous years. This observation suggests birds from the same lek site may initiate

nesting at similar times. Nest predation was not significant this year, but nest abandonment was higher than any other recorded year. The average clutch size was similar to last year (6-7 eggs per nest). Nest success was lower this year (50%) than last year (84%). This decrease may be largely due to the combined impacts of predation and the high abandonment rates observed this year.

Hens moved, on average, 20.1 km. The furthest distance traveled from the lek to brood-rearing habitat was 28.5 km. This demonstrates how valuable large tracts of relatively undisturbed sagebrush are to the life cycle of sage grouse on Parker Mountain. However, if the vegetation treatments implemented this past year improve the present habitat conditions in Parker Lake pasture, hens may not need to travel such long distances to reach productive habitat.

Although the response of the sagebrush to the Parker Lake Pasture tebuthiuron treatments was visually obvious, there were no significant differences in vegetation cover measured between the treated and non-treated sites. We suspect the exceptionally wet year and the delayed effects of the tebuthiuron contributed to the lack of a measurable response. At the end of the grazing season, we recorded more herbaceous cover inside the ungrazed exclosures than outside. However, these earlier recorded differences were negated because of lagomorph impacts. We will assess the effects of lagomorph herbivory on treatment plots next season.

Summary of Biological Information

I. Lek Counts

1998	>273 males
1999	>350 males, up>25%
2000	>350 males, still up but down slightly from 1999
2001	>400 males, up ~20% from last year…highest count in 30 years

II. Nest Initiation

	Y	A	
1998	8/19	8/9	(57%)
1999	6/16	16/17	(67%)
2000	* 13/26		(50%)
2001	* 17/25		(68%)

	Nest Predation	1998	3/16	(19%)
		1999	10/19	(53%)
		2000	2/13	(15%)
		2001	6/17	(35%)

III. Adult Mortality

2000	6/21	
2001	6/25	

(*by the end of August, 21 collars were still transmitting)